Coastal Georgia Regional Development Center
Federal Emergency Management Agency
Cooperating Technical Partner
Mapping Activity Statement

Coastal Georgia Regional Development Center

Agreement #1 - FEMA/NADO Map Modernization Demonstration Project

In accordance with the Cooperating Technical Partners (CTP) Memorandum of Agreement dated August 27, 2001 between the Coastal Georgia Regional Development Center (CGRDC) and the Federal Emergency Management Agency (FEMA), Agreement 1 is as follows:

1. Project Background: The federal government has been assisting Americans who have suffered from natural disasters for well over fifty years. The National Flood Insurance Program was established in the late 1960's to subsidized flood insurance as a means of assisting those who might suffer from flooding. As part of the flood insurance program, FEMA has established minimum standards that must be adopted by local governments in order for their residents to participate in the program. Among other things, local governments must require elevation of residential structures above the one hundred-year floodplain as well as flood proofing of non-residential structures to the one hundred-year elevation. Many communities restrict development, or at least certain types of development in the one hundred-year floodplain.

In order to determine which structures are subject to these rules, and in order to identify the risk of flooding, FEMA has conducted studies to identify the location of the various types of floodplains and has issued Flood Insurance Rate Maps (FIRM). Many of the studies were conducted and maps issued in the 1970's and 1980's and there have been few updates. FEMA reports that "approximately 45 percent of maps are at least ten years old."

In the meantime, a variety of factors have indicated the need to update maps:

- improved mapping techniques provide both better base mapping of elevations and more accurate identification of floodplains
- more sophisticated models give a better representation of the nature of flooding scenarios
- increased development pressures in some areas result in the need for more accurate delineation of floodplains to protect new residents
- increased development means that land is more expensive and more development is likely to be affected by flooding
- some older maps are based on land use analyses (such as percent of impervious cover and runoff coefficients) that may not reflect changing development patterns
- the older maps are frequently not available in digital form (called "DFIRM") so they can be integrated with GIS mapping.

In many parts of the country, particularly in large urban areas, map modernization efforts are underway. These activities have been aided by large city and urban county governments with sophisticated engineering and GIS staff that have the resources to conduct studies and make new maps. In rural areas, smaller, less sophisticated government organizations often lack the resources to carry out this work. In addition, rural communities and counties on the outer fringe of metropolitan areas are the locations where much new growth is occurring.

This project, initiated as a result of discussions between FEMA and the National Association of Development Organizations (NADO), is aimed at assisting these smaller, less sophisticated governments with map modernization. NADO represents over 260 regional development organizations (RDOs) that are in a position to directly serve rural local governments. By taking a regional approach, the local governments can band together to supply the staff and equipment resources to solve this problem collectively. In addition, the RDOs that are members of NADO have excellent relationships both with the state and federal agencies that will be involved in map modernization, as well as with the local governments that will receive and use the improved mapping information.

2. Project Objectives: The objectives of this project are:
   - to develop techniques for modernizing floodplain maps for rural jurisdictions in a cost effective and method-appropriate manner using RDO resources
   - provide improved maps to the rural cities and counties in the coastal Georgia region as a means of testing and refining these techniques
   - provide information and advice on the use of mapping to selected rural cities and counties in the coastal Georgia region as a means of testing and refining these techniques
   - disseminate the results of the project to all RDO's as a means of assisting in the application of these methods nationwide.

A key component of this project is to use the resources and techniques that are most appropriate for the situation. Early on, it was clear that the best available mapping technique is LIDAR ("light detection and ranging") but that LIDAR can be cost-prohibitive in some instances. On the other hand, not all areas require the accuracy of LIDAR in order to produce maps that meet floodplain management needs. One element of the project, therefore, is to develop a "triage" technique to determine which mapping methods are appropriate for which situations.

The extent of work required to conduct this study may exceed available resources. This emphasizes the challenge of the "triage" approach. It will be very important during the course of conducting the study to constantly monitor the quality of information available and the real need for information to be updated so that we do not expect more than the resources will allow. Indeed, this to be a main focus of the project - i.e., to develop the technique for obtaining the best mapping at a reasonable price and to best allocate resources for update of flood studies. The goal is to help FEMA and the RDO members of NADO use these techniques to improve their mapping at the lowest cost consistent with adequately benefiting the public.

3. Project Partners

There are a number of state and federal agencies that are willing to assist with this project, and the broad range of technical and management expertise they represent is vast. NADO and FEMA understand the importance of involving a wide range of agencies as resources in the development of a regional partnership approach.

The following organizations are (or are potentially) partners with NADO, FEMA, and the CGRDC in this project:

- Federal Emergency Management Agency (FEMA) Region IV - Atlanta

- US Army Corps of Engineers (USCOE) - Savannah District Office
- National Oceanographic and Atmospheric Administration (NOAA), Coastal Services Center - Charleston, South Carolina
- NOAA, National Weather Service, Southeast River Forecast Center (SERFC) - Peachtree City, Georgia
- US Geological Survey (USGS)
- NRCS, coordinated through the state office and the local offices
- Georgia Emergency Management Agency (GEMA) - Atlanta and Statesboro Offices
- Georgia Department of Natural Resources (DNR), Coastal Resources Division (CRD) - Brunswick
- Georgia DNR, Environmental Protection Division (EPD), Floodplain Management Program
- Georgia Department of Transportation (DOT) - District 1, Jessup, along with other sections of DOT to be suggested by the District office
- Georgia Tech (DOQQ mapping)

4. Description of Work

The project is organized in four phases. Funding to be provided will not exceed $400,000 for all four Phases of work. The breakdown of this $400,000 is laid out in the Funding section of each Phase.

Phase 1 - Mapping Needs Assessment

Purpose: Evaluate the seven county area of: ~~Bullock~~ Bulloch, Effingham, Bryan, Liberty, Long, McIntosh, and Camden to determine a priority of mapping needs. The Mapping Needs Assessment will be based upon a weighted matrix using the criteria shown in the activities below.

Activities:

- Collect existing base and topographic data from appropriate Local, State, and Federal Agencies. At a minimum the Partners listed in the "Project Partners" section of this Mapping Activity Statement shall be contacted.
- Evaluate base and topographic data to ensure compliance with FEMA 37 and FEMA's LIDAR specifications
- Develop a summary of the existing Flood Insurance Study data to include stream reaches studied, study methodologies, and date of study.
- Conduct interviews with local communities in the seven county area to identify local flooding issues.
- Conduct analyses of existing and projected land use to determine areas which may require updated mapping of the Special Flood Hazard Areas. This would include existing studied areas and areas not previously shown as flood prone.
- Develop a weighted matrix based on the above criteria in order to prioritize the flood study needs based on a countywide analysis.

Period of Performance: This phase will commence upon execution of Cooperating Partner Memorandum of Agreement (MOA) and will be completed in no longer than 6 months

Deliverables:

- Report describing the Mapping Needs Assessment Process and the results derived from the Priority Matrix.
- Report to be delivered to FEMA in Hardcopy and Digital format.
- Scope of Work and Budget to perform a Flood Insurance Study for the ranked Counties determined by the Mapping Needs Assessment. Scope of Work shall be developed in compliance with *Guidelines and Specifications for Study Contractors*, FEMA 37.

Funding: FEMA will review the information provided by CGRDC in Phase 1 and make a determination for the expenditure of funding for Phase 2. The funding for Phase 1 shall not exceed $50,000. The CGRDC will submit a bi-monthly status report including an estimate of the percentage of work completed. At that time, FEMA will reimburse the CGRDC for its expenditures.

Phase 2 - Flood Insurance Study Update

Purpose: Based upon the results of Phase 1, develop composite base and topographic mapping and detailed flood elevations for those communities approved for restudy by FEMA.

Standards:

- Quarterly status reports which include the percentage of work completed for this Phase, major accomplishments made during the quarter, any major problems encountered, and the resolution of any major problems encountered.
- Hydrologic and Hydraulic mapping will follow the standards set forth in FEMA 37, *Guidelines and Specifications for Study Contractors* (January 1995) and Title 44 of the Code of Federal Regulations (CFR), Part 65. FEMA 37 is available at FEMA's web site at http://www.fema.gov/mit/tsd/EN_reg.htm.
- Computer models used for hydrologic and/or hydraulic analyses will meet the requirements of 44 CFR 65.6(a)(6) and be on FEMA's *Numerical Models Accepted by FEMA for NFIP Usage* (http://www.fema.gov/mit/tsd/EN_modl.htm).
- Topographic mapping used to delineate floodplain and floodway boundaries will be of adequate scale and topographic definition to provide reasonable accuracy. Planimetric features will be compatible with the base map (with respect to horizontal accuracy) to be used by FEMA for Digital FIRM production. Topographic mapping taken from aerial photogrammetry or surveys will comply with the requirements of Appendix 4 of FEMA 37. The selection of the topographic mapping source to be used will be coordinated with the FEMA Project Officer prior to analysis and mapping.
- Any levee or dike systems to be shown on the community's FIRM as providing protection from the 1% annual chance flood will comply with the requirements of 44 CFR 65.10. Chapter 7 of FEMA 37 provides guidelines for evaluating levee systems.

- Flood elevations and floodplain and floodway boundaries will reasonably tie in to non-revised information in accordance with 44 CFR 65.6(a)(6).
- The floodway will be established in accordance with 44 CFR 65.7, as well as any applicable state requirements.
- Digital mapping will comply with the requirements of Chapter 9 and Appendix 7 of FEMA 37.
- Automated data processing and modeling algorithms for GIS-based modeling and mapping will be documented and provided to ensure they are consistent with the standards outlined above. Digital data sets (such as elevation, basin, or land use data) will be documented and provided to FEMA for approval prior to performing the analysis to ensure they meet minimum requirements. If non-commercial (i.e., custom developed) software is used for the analysis, then full user documentation, technical algorithm documentation, and the software will be provided to FEMA for review prior to performing the scope of work.
- Digital Elevation Models (DEMs) and/or National Elevation Dataset (NED) field survey data will meet vertical accuracy requirements contained in Appendix 4 of FEMA 37.

Activities:

- Compile the Base and Topographic Data for the Counties to be studied. These data must meet FEMA's specifications indicated above.
- Submit compiled base and topographic data to FEMA's MCC for compliance review and Quality Control.
- Develop detailed hydrologic analyses and submit to FEMA's MCC for compliance review and Quality Control prior to proceeding to Hydraulic Analysis.
- Develop detailed hydraulic analyses.

Period of Performance: This phase will commence upon completion of Phase 1 and Notice to Proceed by FEMA. This phase will be completed in no more than 12 months.

Deliverables: The CGRDC will make available to FEMA's MCC the items outlined in Chapter 11 of FEMA 37 in the Technical Support Data Notebook (TSDN) format. These include:

- Digital 1% and 0.2 % annual chance floodplain and floodway boundaries;
- Digital profiles of the 10%, 2%, 1%, and 0.2% annual chance water surface elevations representing existing conditions;
- Flood Insurance Study (FIS) report;
- Floodway data tables;
- Digital copies of all hydrologic and hydraulic modeling (input and output files); and
- All back-up data used in the analyses or mapping.

Funding: Funding for Phase 2 and 3 shall not exceed $300,000. The division of this funding shall be determined prior to FEMA issuing a Notice to Proceed for Phase 2. The Quarterly status reports submitted to FEMA shall include an estimate for the percentage of work completed. At that time, FEMA will reimburse the CGRDC for its expenditures.

Phase 3 - Produce Digital Flood Insurance Rate Maps (DFIRMs)

Purpose: Apply revised/updated flood studies to create new preliminary Countywide Digital Flood Insurance Rate Maps for the Counties studied in Phase 2.

Standards:

- *Guidelines and Specifications for Study Contractors* (FEMA 37) available via the internet at http://www.fema.gov/mit/tsd/EN_reg.htm.
- *Guidelines and Specifications for Flood Map Production Coordination Contractors* (Draft February 17, 1999).
- *Base Map Standards for DFIRMs* (FEMA). This document provides minimum base map standards for DFIRMs. These include the following requirements for DFIRM base map data:
  - cover the community(s) or county(s) completely;
  - be distributable by FEMA to the public;
  - meet the minimum accuracy requirements outlined in the document; and
  - include all required features.
- *Digital Flood Insurance Rate Map (DFIRM) Specifications.* (November 2000) This document provides information about graphic specifications for hardcopy DFIRM products as well as minimum standards for the DFIRM database that accompanies the mapping files, file formats, transfer media, etc. The "Basic DFIRM" tables and items in the DFIRM database apply; optional tables and items are not required.
- *Standards for Digital Orthophotos* (U.S. Geological Survey, National Mapping Program, December 1996).
- *Content Standards for Digital Geospatial Metadata* (Federal Geographic Data Committee, 1998).

Activities:

- Apply digital flood elevation layers (Special Flood Hazard Areas (SFHA) and floodways) derived in Phase 2 to the composite base maps
- Produce draft DFIRMs for review by FEMA and other participating agencies.
- Produce Preliminary DFIRMs for delivery to the Communities studied. Maps will be in GIS format and delivered in both digital and hardcopy formats.
- Post DFIRM information on the CGRDC Web site.

Period of Performance: This phase will commence upon completion of Phase 2 and Notice to Proceed by FEMA. This phase will be completed in no more than 12 months.

Deliverables:

- Quarterly status reports which include the percentage of work completed for this Phase, major accomplishments made during the quarter, any major problems encountered, and the resolution of any major problems encountered.
- DFIRM mapping files in one of the GIS file formats specified in FEMA's *Digital Flood Insurance Rate Map (DFIRM) Specifications.* These files should be provided on CD-ROM.

- DFIRM database files in one of the database formats specified in FEMA's *Digital Flood Insurance Rate Map (DFIRM) Specifications.* These files should also be provided on CD-ROM.
- Metadata files describing the DFIRM data should be provided. These files will include the required information and follow the examples shown in FEMA's *Digital Flood Insurance Rate Map (DFIRM) Specifications.*
- A complete set of plots of the DFIRM panels showing all detail at the scale(s) approved under the first milestone will be provided. Acceptable DFIRM scales are 1"=500', 1"=1000', and 1"=2000'.
- A Quality Assurance/Quality Control (QA/QC) report that includes a description and the results of all automated or manual quality assurance steps taken during the preparation of the DFIRMs will be provided.

Funding: Funding for this Phase shall be contingent upon the funding determined for Phase 2. Funding for Phase 2 and 3 shall not exceed $300,000. The Quarterly status reports submitted to FEMA shall include an estimate for the percentage of work completed. At that time, FEMA will reimburse the CGRDC for its expenditures.

Phase 4 - Outreach

Purpose: Assist local governments in use of DFIRM mapping, including incorporation of mapping into other GIS products. Present information on techniques developed to FEMA and NADO for dissemination to RDO's.

Activities:

- Conduct a minimum of two meetings per Phase during Phase 2 and 3, in order to coordinate with the Counties being studied.
- Prepare Press Releases for new DFIRM Product prior to Final CCO meeting.
- Assist FEMA in the presentation of results from Phase 1-3 to local governments at Final CCO meeting.
- Prepare and conduct two regional seminars for local governments about how to properly use DFIRM product.
- Prepare and make two presentations at NADO meetings describing the techniques used in updating base maps, flood studies, and DFIRM's for smaller, rural jurisdictions.
- Prepare Executive Summary of the activities completed in Phase 1-3.
- Prepare final report and technical manual describing techniques used in Phase 1-4. Final report will include the Executive Summary.

Period of Performance: This phase will commence upon execution of Cooperating Partner Memorandum of Agreement (MOA) and will be completed in no longer than 36 months

Deliverables:

- Minutes for the 4 meetings to be conducted in Phase 2 and 3.
- Digital and Hardcopies of Seminars and Press Releases
- Digital and Hardcopy of Final Report

Funding: Funding for Phase 4 shall not exceed $50,000. The CGRDC shall submit invoices for this Phase as needed, including a breakdown of work performed. Upon receipt of invoice, FEMA will reimburse the CGRDC for its expenditures.

5. **Points of Contact:** The FEMA Project Officer is Laura Algeo and the CTP's Project Manager is Vernon Martin, or subsequent personnel of comparable experience who are appointed to fulfill these responsibilities.

Each party has caused this Mapping Activity Statement to be executed by its duly authorized representatives.

Vernon Martin, CGRDC — date 8/14/01

Todd Davison, FEMA — date 8/27/01